

Center for Scientific Review

National Institutes of Health

Scientific Areas of Integrated Review Groups (IRGs)

For a listing of the Scientific Review Administrator and membership roster for each study section, click on the study section roster under the study section name within an IRG listed below or go to the [study section index](#) (study sections listed alphabetically) and click on the specified roster next to the name of the study section.

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Referral & Review

Endocrinology, Metabolism, Nutrition and Reproductive Sciences IRG [EMNR]

The Endocrinology, Metabolism, Nutrition and Reproductive Sciences [EMNR] IRG reviews applications addressing molecular, cellular, and higher order hormone-regulated processes in physiology and pathophysiology. EMNR will evaluate applications on basic and clinical aspects of hypothalamic, pituitary, gonadal, thyroid, and adrenal physiology and pathophysiology, diabetes mellitus (including its pathogenesis, complications and treatment), the biology of the pancreatic islet (beta cell), adipocyte biology, obesity (including its causes and treatment), and other metabolic disorders including inborn errors of metabolism and nutrient transport disorders. Also reviewed in this IRG are applications addressing the biology of reproduction and the pathobiology of its disorders (including the causes and treatments of infertility); male and female reproductive aging and menopause; obstetrical disorders of implantation, gestation, embryogenesis, and parturition; disorders of fetal and neonatal life; and gynecologic conditions are reviewed in this IRG. Studies of the role of nutrition under normal and pathological conditions are also reviewed in this IRG.

This IRG also reviews applications involving integrative physiology and pathophysiology such as neuroendocrinology; humoral actions on the gut, lung and heart; cancers of the endocrine glands; as well as studies related to the effects and mechanisms of action of drugs, biopharmaceuticals, alcohol and toxicants, xenobiotics and endobiotics on reproduction or on endocrine glands. Applications reviewed in this IRG may propose a broad range of basic or clinical research methods and techniques, including pharmacologic, chemical and biochemical approaches, genetics, genomics and proteomics, molecular and cell biology techniques, animal models, and patient-oriented studies involving these research topics mentioned above.

Study sections in this IRG include:

[Molecular and Cellular Endocrinology \[MCE\]](#)

[Integrative and Clinical Endocrinology and Reproduction \[ICER\]](#)

[Cellular, Molecular, and Integrative Reproduction \[CMIR\]](#)

[Pregnancy and Neonatology \[PN\]](#)

[Cellular Aspects of Diabetes and Obesity \[CADO\]](#)

[Integrative Physiology of Obesity and Diabetes \[IPOD\]](#)

[Integrative Nutrition and Metabolic Processes \[INMP\]](#)

[Endocrinology, Metabolism, Nutrition, and Reproductive Sciences Small Business Activities \[SBIR/STTR\] Special](#)

Molecular and Cellular Endocrinology Study Section [MCE]

[\[MCE Roster\]](#)

The Molecular and Cellular Endocrinology Study Section [MCE] reviews studies that address the molecular and cell biology of endocrine organs and their products, both hormones and growth factors. This includes the synthesis and secretion of local and circulating hormones and growth factors (including, but not limited to, polypeptides and lipid-based ligands) and their mechanisms of action as they interact with cell-surface and nuclear receptors to influence cell structure, function, and the regulation of gene expression in both normal and pathologic states.

Specific areas covered by MCE:

- Molecular mechanisms of polypeptide hormone, steroid hormone, xenobiotic and endobiotic action (including: hormone synthesis, processing, secretion, signaling, and trafficking)
- Hormonal and growth factor regulation of gene expression, including: DNA-binding proteins, coactivators, corepressors, and other modulators of transcription
- Regulation of cell growth and differentiation by hormones and growth factors
- Structure/function relationships of hormone receptors
- Functional analysis of genomic and proteomic patterns of hormone action
- Nuclear receptors

MCE has the following shared interests within the EMNR IRG:

- **With Integrative and Clinical Endocrinology and Reproduction [ICER]:** There are shared interests with ICER concerning effects of hormones on growth and developmental disorders, and on key components of the hypothalamic-pituitary end-organ axis. While ICER focuses on physiological processes and population-based studies, MCE addresses the mechanistic bases of these physiological changes.
- **With Cellular, Molecular and Integrative Reproduction [CMIR]:** CMIR focuses on the physiology and pathobiology of reproductive organs, including studies that link molecular mechanism with physiological outcomes. Reproductive studies that focus on hormone mechanism and function at the molecular level may be better suited for MCE.
- **With Cellular Aspects of Diabetes and Obesity [CADO] and Integrative Physiology of Obesity and Diabetes [IPOD]:** Factors that affect adipocyte differentiation and biology (e.g., endocrine products that regulate gene expression) are typically referred to CADO or IPOD. Studies that focus on hormone mechanism and function at the molecular level may be better suited for MCE. Conversely, when the regulation of gene expression by endocrine agents is secondary to their impact on adipocyte differentiation, assignment may be to CADO or IPOD.
- **With Integrative Nutrition and Metabolic Processes [INMP]:** Applications focused on nutrient regulation of gene expression, generally would be referred to INMP. However, when the nutrient acts through components of the endocrine system and the focus is on the role of the endocrine system, assignment may be to MCE.
- **With all Study Sections in the EMNR IRG:** Leptin effects on specific endocrine systems may be covered in several study sections within the EMNR IRG. The mechanism by which leptin interacts with signaling cascades can be referred to MCE.

MCE has the following shared interests outside the EMNR IRG:

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** Studies of protein structure, folding, or structure activity relationships directed toward hormones, growth factors, or their receptors could be referred to MCE or BCMB depending whether the utility of the study's outcome is uniquely related to endocrinological issues.
- **With the Genes, Genomes, and Genetics [GGG] IRG:** Shared interests exist with regulatory mechanisms of gene expression as well as chromatin structure and dynamics. Studies that consider these topics and focus on hormones, their cognate receptors or co-regulators, and their target genes could be referred to MCE. Basic studies of regulatory mechanisms of gene expression or chromatin structure and dynamics or those involving emerging genetic approaches could be assigned to GGG.
- **With the Cell Biology [CB] IRG:** Shared interests exist in areas of intra- and intercellular signaling; cell cycle control; apoptosis; cell junctions, and extracellular matrix. Studies that focus on hormones and growth factors and their sources may be referred to MCE. Studies that focus on the basic cell biology of intra- and intercellular signaling, cell cycle control, apoptosis, cell junctions, and extracellular matrix may be referred to CB.
- **With the Biology of Development and Aging [BDA] IRG:** Applications addressing the endocrinology of aging that focus on mechanisms of aging, such as oxidative stress, DNA damage, or cellular senescence could be referred to BDA when the study has implications that transcend a single organ system or discipline. If the focus of the study is the effect of aging on a specific hormonal process, MCE could be appropriate.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** Shared interest exists in the area of functional analysis of genomic and proteomic patterns. Studies that focus on the functional analysis of genomic and proteomic patterns of hormone action may be assigned to MCE. Studies that focus on emerging technologies for obtaining functional analysis of genomic and proteomic patterns may be assigned to BST.
- **With the Renal and Urological Sciences [RUS] IRG :** There is shared interest between MCE and RUS in male reproductive biology. The perspective of the applicant should determine assignment, but in general the central focus of applications reviewed in RUS is urology (e.g., benign prostate hypertrophy (BPH), including its effect on urinary tract function), and the focus in MCE is on fundamental mechanisms of hormone action (e.g., mechanisms of testosterone signal transduction as found in the prostate).
- **With the Molecular, Cellular and Developmental Neuroscience [MDCN] IRG :** MCE has shared interests with the MDCN IRG in the areas of neuropeptide/receptor interactions, second messengers and effectors, and neuropeptide processing enzymes. Molecular and cellular studies of receptors for hypothalamic-releasing or -inhibiting factors and processing of neuropeptides with a role in the endocrine system, could be assigned to MCE, unless the focus is on neurons/glia in which case they could be assigned to MDCN. Studies of other neuropeptides could be assigned to MDCN.

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Integrative and Clinical Endocrinology and Reproduction Study Section [ICER]

[\[ICER Roster\]](#)

The Integrative and Clinical Endocrinology and Reproduction Study Section [ICER] reviews applications that focus on the physiology and pathophysiology of endocrine systems, and clinical endocrine and reproductive science investigations. Areas of interest also include adaptation and response to environmental stress and homeostatic challenge; genetics and genomics; growth, development, and aging; neuroendocrinology, including neuroendocrine control of reproductive processes; cancer; interactions with the cardiovascular, gastrointestinal and immune systems;

endocrine disruptors/xenobiotics; pharmacology; novel hormone-based therapies; and comparative endocrinology.

Specific areas covered by ICER:

- Pituitary, thyroid, and adrenal physiology and pathophysiology
- Cancers of the endocrine system
- Growth, development, and disorders of endocrine organs and their products
- Neuroendocrinology
- Reproductive neuroendocrinology including, development of the hypothalamic-pituitary gonadal (HPG) axis and mechanisms underlying biorhythms of reproductive hormones
- Hormone interactions with other organ systems and tissues
- Hormones and immunobiology
- Pediatric and developmental endocrinology
- Endocrinology of aging
- Endocrine pharmacology and toxicology, including the actions of endocrine disruptors and xenobiotics
- Endocrine-related disorders of the male and female reproductive systems
- Hormones, stress, and the autonomic system
- Hormone-based therapies
- Comparative endocrinology
- Animal models of endocrine disorders
- Mammary gland development (including maturation and physiology) and hormonal control of lactation

ICER has the following shared interests within the EMNR IRG:

- **With Molecular and Cellular Endocrinology [MCE]:** There are shared interests with MCE on effects of hormones on growth and developmental disorders, and on key components of the hypothalamic-pituitary end-organ axis. While MCE addresses the mechanistic basis of these physiological changes, ICER focuses on integrative aspects of physiological processes and clinical studies.
- **With Cellular, Molecular, and Interactive Reproduction [CMIR] :** CMIR focuses on reproductive organ physiology and pathobiology. Studies that focus on the physiological activity of the hypothalamus and pituitary may be better suited for ICER. Conversely, studies that include contributions from the hypothalamus and pituitary, but emphasize targets in the gonads or reproductive tract, could be referred to CMIR. Other areas of common interest include hormones and aging as related to menopause, endocrine disruptors that affect reproductive function, growth and development (including neonatal biology), and hormonal therapies (including hormone replacement).
- **With Cellular Aspects of Diabetes and Obesity [CADO] and Interactive Physiology of Obesity and Diabetes [IPOD]:** Factors that affect the physiology and pathophysiology of diabetes and obesity could be referred to CADO or IPOD, except when the focus is on reproduction, as may occur in some studies of disorders such as Polycystic Ovarian Syndrome (PCOS). Other areas of shared interest with CADO or IPOD include endocrine/immune interactions, hormones and aging, regulation of the autonomic nervous system, and neuroendocrinology related to satiety and glucose metabolism. When these types of studies target the reproductive system, they could be referred to CMIR if the study is cellular or molecular in nature or ICER if the study is physiological or clinical in nature.

ICER has the following shared interests outside the EMNR IRG:

- **With the Biology of Development and Aging [BDA] IRG:** Shared interest exists for studies of the age dependence of endocrine physiology and pharmacology. Physiological or clinical studies of age-related changes involving the endocrine system could be referred to ICER. Studies focused on multiple physiologic systems, life-span extension, or caloric restriction could be referred to BDA. Male and female reproductive aging across

and within the HPG axis is another area of shared interest. Where the focus is the endocrine system, the application could be referred to ICER. If the focus is on mechanisms of aging (such as oxidative stress, DNA damage, or cell senescence), or when the study addresses the "primordial organ" or has implications that transcend a single organ system or discipline, the application could be referred to BDA. Studies of interactions between the HPG axis and non-reproductive physiologic systems could be referred to BDA if the focus is aging.

- **With the Risk, Prevention and Health Behavior [RPHB] IRG:** Shared interest exists for the adaptation and response to environmental stress and resultant homeostatic challenge, particularly regarding regulation of the hypothalamic-pituitary-adrenal axis, and as a precursor to, or risk factor for, clinical morbidity (such as obesity, cardiovascular disease and depression). Applications that deal with adaptation and response at the hormonal or cellular level could be assigned to ICER. Those that deal with an individual behavioral response, as an adaptation or response to stress, and that are associated with the prevention, exacerbation, or treatment of clinical or psychological illness could be assigned to RPHB.
- **With the Biobehavioral and Behavioral Processes [BBBP] IRG:** Studies that focus on basic aspects of neuroendocrinology (including effects on reproduction), endocrine pharmacology and toxicology, hormones and immunobiology, hormones and the cardiovascular system, or stress and autonomic regulation could be assigned to ICER. When the focus is the role of biobehavioral processes, such as: psychoneuroimmunology, effects of behavioral stress, psychoneuroendocrinology, behavioral development, feeding behavior, cognition, psychopathology, regulation of emotion, parental and affiliative behavior, or other socio-sexual processes assignment could be to BBBP.
- **With the Immunology [IMM] IRG:** Basic and clinical studies of autoimmunity and inflammation as related to endocrine disorders (including diabetes, thyroid, adrenal, and other non-gonadal glands) could be referred to ICER. In contrast, studies focused on fundamental aspects of immunochemistry; immunogenetics; and cellular, molecular, and developmental immunology could be referred to IMM.
- **With the Oncological Sciences [ONC] IRG:** In general, studies of endocrine cancers (such as pituitary, thyroid, and other endocrine glands) would be referred to ICER. Studies of the effect of hormones on the progression of other cancers could be referred to ONC. When the primary focus of basic or clinical studies is on the hormone or endocrine organ, assignment may be made to ICER. Proposals that focus on the biology or clinical aspects of cancer, where hormones receive a secondary consideration, are better suited to ONC.
- **With the Cardiovascular Sciences [CVS] IRG:** Shared interest exists for studies of the effect of hormones on the vascular system, cardiac physiology, and hypertension. Physiological or clinical studies that focus on the role of hormones could be referred to ICER. In contrast, if focus is on the vascular system, cardiac physiology, or hypertension, assignment could be to CVS.
- **With the Musculoskeletal, Oral, and Skin Sciences [MOSS] IRG:** There are shared interests in the role of hormones on regulation of musculoskeletal, oral, and skin development and physiology. Applications that focus on hormonal control or growth factor control could be referred to ICER, studies that focus on the tissue could be referred to MOSS.
- **With the Digestive Sciences [DIG] IRG:** (1) Shared interest exists for the metabolism, pharmacology and toxicology of xenobiotics, and endocrine disruptors. Studies focused on the action of xenobiotics, and endocrine disruptors on endocrine systems could be referred to ICER. When interaction with the endocrine system is not the primary focus, assignment could be to DIG. (2) When the primary focus is on hormones of the gastrointestinal tract or peptides and neurotransmitters of the brain-gut axis, the application could be assigned to DIG. Applications that focus on GI hormones that interact with pituitary or pancreatic hormones at the endocrine gland level could be assigned to ICER.
- **With the Respiratory Sciences [RES] IRG:** There is shared interest in the physiology or pathology of the respiratory system. Studies focused on endocrine interactions could be referred to ICER. When interaction with the endocrine system is not the primary focus, assignment could be to RES.

- **With the Renal and Urological Sciences [RUS] IRG :** Studies of the mechanism of action of hormones on urologic or renal development or diseases of the urinary tract could be assigned to RUS. Studies of the mechanism of action of hormones on the male genital system could be assigned to ICER or RUS depending on the focus of the application.
- **With the Molecular, Cellular, and Developmental Neuroscience [MDCN] IRG:** There are shared interests in the areas of development of the HPG axis and its dysfunction, behavior, and memory. Applications involved with sexually determined nervous system differentiation and neural regulation of reproductive function and gonadal feedback may be referred to ICER. Applications that focus on the nervous system may be referred to MDCN. Projects that focus on hormone actions in the brain (such as estrogens, adrenal corticosteroids and other endocrine agents) may be referred to ICER. When the focus is on regulation of synaptic plasticity or other aspects of neural biology, assignment to MDCN may be more appropriate.
- **With the Integrative, Functional, and Cognitive Neuroscience [IFCN] IRG :** Projects that focus on the HPG axis interactions may be of shared interest. IFCN could consider applications dealing with stress and the HPG axis, where the focus is the underlying neural mechanisms of feeding, cognition, emotional regulation, parental and affiliative behavior, and other reproductive behavior processes may be assigned to IFCN. ICER could consider studies involving neuroendocrine organs (e.g., pituitary, hypothalamus) where the focus is on the hormone (e.g., its synthesis, release, regulation, and/or mechanism of action.) Also, studies of neural or neuroendocrine control of reproductive processes such as gonadal function, fertilization, implantation, or parturition, or related events (e.g., GnRH secretion, the LH surge, lactation) may be assigned to ICER.
- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** ICER has shared interests with the BDCN IRG. BDCN could be assigned applications that focus on neural disorders and/or injury of the nervous system, whereas ICER could be assigned applications related to neuroendocrine control of reproduction. Thus, ICER could be assigned applications in the area of gonadotrophin releasing hormones, pituitary hypothalamic connections and pituitary gonadal interactions.

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Cellular, Molecular and Integrative Reproduction Study Section [CMIR]

[\[CMIR Roster\]](#)

The Cellular, Molecular and Integrative Reproduction study section [CMIR] reviews applications concerned with molecular, cellular, systems, and integrative aspects of reproductive biology. This encompasses the biology of germ cells and gametes, early events in conception (including research relevant to assisted reproductive technologies), and embryo development (including embryonic stem cells until the stage of implantation). Also included are reproductive toxicology; gonadal function; puberty; male and female reproductive aging; the male and female reproductive tracts and their disorders; and research on infertility, contraception, gynecology, and andrology.

Specific areas covered by CMIR:

- Origin and differentiation of germ cells: the endocrine, paracrine and physiologic mechanisms involved in oogenesis and spermatogenesis (including: germ-cell/somatic-cell interactions, germ-cell proliferation and apoptosis, and germ-cell transplantation)
- Pre-implantation embryonic development, including: zygotic gene activation, autocrine/paracrine factors, and environmental influences on gene expression
- Embryo implantation, including uterine receptivity and embryo/trophoblast-maternal tissue interactions
- Sexual development, maturation, and sex determination of the male and female gonads and reproductive tracts, including issues relevant to imprinting
- Embryonic stem cell biology, including mechanisms regulating stem cell differentiation

- Epigenetic factors in development
- Animal cloning and nuclear reprogramming
- Structure, function, and regulation of the male reproductive system
- Fertilization, including: sperm motility and capacitation, *zona pellucida* binding, and mechanisms to block polyspermy
- Basic mechanistic and physiological studies of infertility in males and females (including reproductive failure associated with metabolic diseases)
- Studies directed toward the development of assisted reproductive technologies, including aspects of cryobiology
- Effects of pharmaceuticals, xenobiotics and environmental factors on reproduction
- Contraception
- Puberty, male and female reproductive aging, and the menopausal transition
- Mammary gland development (including maturation and physiology) and hormonal control of lactation
- Physiology and pathophysiology of the female reproductive system and tract

CMIR has the following shared interests within the EMNR IRG:

- **With Molecular and Cellular Endocrinology [MCE]:** There is shared interest in reproductive organ physiology and pathobiology. CMIR may be assigned projects that link molecular mechanisms with physiological outcomes; whereas, reproductive studies that focus on molecular aspects of hormone action would be better suited for MCE. Although MCE focuses on steroidogenesis, CMIR could be assigned proposals dealing with gonadal steroidogenesis and its regulation.
- **With Integrative and Clinical Endocrinology and Reproduction [ICER]:** ICER may review applications involved with physiology and pathophysiology of endocrine systems other than reproductive systems and neuroendocrine studies, including neuroendocrine effects on the reproductive system. Clinical studies of the female reproductive system may be referred to ICER. Applications involving growth, development and aging of the reproductive system, feed back, and gonadal hormone replacement therapies may be referred to CMIR.
- **With Pregnancy and Neonatology [PN]:** There is shared interest in the peri-implantation period. If the focus of the application is cellular or molecular in nature, assignment may be to CMIR. If the focus of the application is more physiological or clinical in nature, assignment may be to PN. Clinical studies of the female reproductive system may be referred to PN.
- **With Cellular Aspects of Diabetes and Obesity [CADO] and Integrative Physiology of Obesity and Diabetes [IPOD]:** Studies of factors that affect the physiology and pathophysiology of diabetes and obesity could be referred to CADO or IPOD. However, when the focus is reproduction, as may occur in some studies of disorders such as Polycystic Ovarian Syndrome (PCOS), CMIR may be more appropriate. Applications that focus on reproduction or gonadal biology could be referred to CMIR, whereas applications that focus on insulin action may be referred to CADO or IPOD. Other areas of shared interest with CADO or IPOD include endocrine/immune interactions, hormones and aging, regulation of the autonomic nervous system, and neuroendocrinology related to satiety and glucose metabolism.

CMIR has the following shared interests outside the EMNR IRG:

- **With the Genes, Genomes, and Genetics [GGG] IRG:** The study of epigenetic factors in development and genetic imprinting are a shared interest between GGG and CMIR. Where emphasis is on the mechanism of imprinting or another epigenetic phenomenon, assignment to GGG may be appropriate. Where emphasis is on regulating a reproductive process, assignment to CMIR may be appropriate.
- **With the Cell Biology [CB] IRG:** Cell biology studies of gametogenesis and reproductive tract remodeling are shared interests and could be assigned to CB or CMIR depending on whether the focus of the study is cell biology or reproduction.

- **With the Biology of Development and Aging [BDA] IRG:** There is extensive shared interest in the areas of gametogenesis and fertilization, including: formation of egg and sperm, fertilization, pre-implantation, animal cloning and organogenesis. When the focus of the application is reproduction, assignment may be to CMIR; when the focus is on development, assignment may be to BDA.
- **With the Immunology [IMM] IRG:** There are shared interests in the areas of reproductive immunology, autoimmune ovarian failure, immune infertility, and immuno-contraception. Applications investigating basic immune mechanisms could be referred to IMM, whereas those that focus on reproductive aspects or ramifications could be referred to CMIR.
- **With the Infectious Diseases and Microbiology [IDM] IRG:** There is shared interest in genital tract infections related to infertility. Applications that focus on damage to the genital system or alteration of reproductive capacity caused by infectious agents could be referred to CMIR; those that focus on the infectious agent or its treatment could be referred to IDM.
- **With the Oncological Sciences [ONC] IRG:** Areas of shared interest include endometrial hyperplasia, mammary neoplasia, and germ cell tumors. Applications that involve hormonal alterations in reproductive tissues producing neoplasia could be referred to CMIR. Applications that focus on malignancy could be referred to ONC.
- **With the Cardiovascular Sciences [CVS] IRG:** There is shared interest in ovarian angiogenesis and luteal development. Angiogenesis affecting ovarian function could be referred to CMIR. Applications on other aspects of angiogenesis and vascular cell biology could be assigned to CVS.
- **With the Musculoskeletal, Oral, and Skin Sciences [MOSS] IRG:** There are shared interests in the areas of menopause and osteoporosis, uterine tissue/menstruation, ovulation-related remodeling and pelvic floor support. Applications whose endpoints are remodeling of reproductive tissues or reproductive function may be assigned to CMIR. Basic or translational studies evaluating alterations in the supporting pelvic floor musculoskeletal structures, or with a primary focus of bone disease, including osteoporosis, may be assigned to MOSS.
- **With the Renal and Urological Sciences [RUS] IRG:** There is shared interest between CMIR and RUS in the areas of male reproductive biology and the male reproductive tract, including the prostate. The perspective of the applicant should determine assignment, but in general the central focus of applications reviewed in CMIR is on reproductive competency (e.g., the role of prostatic fluids in sperm motility), the focus of RUS is urology (e.g., BPH, including its effect on urinary tract function). While CMIR will review the full spectrum of reproductive sciences, including molecular, cellular, and physiological studies, RUS could offer its review expertise in clinical urology research, particularly in the areas of male infertility and sexual function, as an alternative review venue.
- **With the Surgical Sciences, Biomedical Imaging, and Bioengineering [SBIB] IRG:** There is shared interest in the area of diagnostic imaging of the reproductive systems. Studies that relate to reproductive function and structures could be referred to CMIR. Studies that focus on the development of imaging equipment or protocols could be referred to SBIB.
- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** There is shared interest in the areas of hormonal influences on neurodegenerative diseases and brain injury. Proposals that deal with effects of neurodegenerative brain injury on reproduction or effects of gonadal steroids on neurological diseases and brain injury may be referred to CMIR or to BDCN depending on the focus of the study.

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Pregnancy and Neonatology Study Section [PN]

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The Pregnancy and Neonatology study section [PN] covers all aspects of intrauterine mammalian development from implantation through pregnancy, parturition and the neonatal period. Areas include the normal physiology of pregnancy, parturition and the postpartum period as well as clinical obstetrics, disorders of pregnancy, neonatal development and diseases of the newborn. In addition, research related to the immunology of pregnancy; maternal nutrition; the effects of pharmaceuticals, xenobiotic agents, and environmental toxicants on pregnancy; and placental endocrinology and function can be reviewed in PN. Techniques and/or research models utilized include: clinical and basic genetics, molecular biology, cellular and organ physiology, and integrative biology.

Specific areas covered by PN:

- Trophoblast invasion, maternal-fetal interactions, and diagnosis and treatment of ectopic pregnancy
- Placental development, trophoblast differentiation, placental endocrinology, transport functions and utero-placental blood flow
- Pregnancy and mechanisms leading to parturition (including: endocrine, immunologic, infectious, and coagulation factors)
- Disorders of pregnancy (preeclampsia, gestational diabetes, and other diseases affecting pregnancy)
- Fetal and neonatal biology, including: fetal growth and development, fetal physiology, fetal diseases, *in-utero* infection, transition to extra-uterine life, and neonatal physiology and pathophysiology
- Immunologic issues of pregnancy, including: immuno-tolerance mechanisms, immunologic basis of complications of pregnancy and loss of the fetus, and autoimmune diseases
- Endocrinologic aspects of pregnancy as they relate to placental hormone production, endocrine disorders during pregnancy, and fetal endocrinology
- Conditions leading to recurrent pregnancy loss, including factors related to: immunology, infection, and genetic or structural abnormalities of the reproductive system
- Pregnancy-related studies of pharmacology and toxicology, including: placental transport mechanisms, pharmacokinetics of drugs during pregnancy, and the effects of metabolic products of pharmaceuticals and xenobiotics
- Nutrition during pregnancy as it relates to: maternal physiology, placental function, fetal growth and development, and neonatal health
- Pregnancy-related and neonatal aspects of sudden infant death syndrome (SIDS)

PN has the following shared interests within the EMNR IRG:

- **With Molecular and Cellular Endocrinology [MCE]:** There is shared interest with aspects of endocrinology, including: steroidogenesis and hormone synthesis, secretion, and action. Applications dealing with placental function, the production and action of trophoblast hormones as well as actions of hormone on the placenta and fetal tissue may be directed to PN.
- **With Integrative and Clinical Endocrinology and Reproduction [ICER]:** There may be shared interest with respect to endocrine changes in pregnancy. Applications dealing with endocrine functions that directly affect pregnancy outcome or placental and fetal function could be referred to PN.
- **With Cellular, Molecular, and Integrative Reproduction [CMIR]:** There is shared interest with respect to uterine biology during the pre-implantation period. Applications focused on uterine function or biology could be referred to PN, while applications dealing with embryonic development in the pre-implantation period could be referred to CMIR.
- **With Cellular Aspects of Diabetes and Obesity [CADO]:** There is shared interest in the area of diabetes during pregnancy (including insulin-dependent diabetes, non-insulin-dependent diabetes, and gestational

diabetes). Studies that address fundamental aspects of glucose metabolism, glucose homeostasis, and glucose utilization could be reviewed in CADO. Proposals related to the pathophysiology, diagnosis, management, treatment and outcomes of diabetes during pregnancy could be reviewed in PN.

- **With Integrative Physiology of Obesity and Diabetes [IPOD]:** There is shared interest in diabetes during pregnancy. Applications focused on carbohydrate metabolism, insulin secretion, pre- and post-natal diabetes and long-term diabetic outcomes may be referred to IPOD. Applications related to the pathophysiology of diabetes during pregnancy, maternal and fetal outcomes, and the diagnosis and clinical management of diabetes during pregnancy could be referred to PN.
- **With Integrative Nutrition and Metabolic Processes [INMP]:** There is shared interest with applications that address nutrient metabolism during pregnancy. PN may be assigned studies on the impact of diet on pregnancy, pregnancy outcomes, fetal development and growth; whereas, INMP could be assigned studies involving abnormalities of fuel metabolism or fundamental nutrient biology during pregnancy.

PN has the following shared interests outside the EMNR IRG:

- **With the Cell Biology [CB] IRG:** Studies of implantation relating to pregnancy could be referred to PN, however, if implantation is being used as a model system to address cell biology questions that can be generalized, CB may be more appropriate. Studies of fetal membranes could be referred to PN or to CB depending on whether the utility of the study's outcome is uniquely related to endocrinological issues.
- **With the Biology of Development and Aging [BDA] IRG :** There is shared interest in the area of embryonic/fetal development. In general, applications focused on pregnancy and reproductive systems may be referred to PN. The application could be referred to BDA, if the focus is mechanism of development, it addresses the "primordial organ", or has implications that transcend a single organ system or discipline.
- **With the Health of the Population [HOP] IRG:** Shared interest exists regarding maternal nutrition and pregnancy outcomes, specifically with regard to disorders of pregnancy. Studies that focus on genetics, molecular biology, cellular or organ physiology and integrative biology could be referred to PN. Studies that focus on the relationship between pregnancy outcomes and their relationship with socio-demographic factors, including population studies related to epidemiology or large-scale interventions, could be referred to HOP. Applications that focus on human behavioral aspects of maternal nutrition (eating patterns, compliance with nutritional, behavioral, or psychosocial interventions or interpersonal support) as a risk factor or intervention for pregnancy outcomes could be referred to HOP or RPHB.
- **With the Risk, Prevention and Health Behavior [RPHB] IRG:** Shared interest exists regarding maternal nutrition and pregnancy outcomes, specifically with regard to disorders of pregnancy. Studies that focus on genetics, molecular biology, cellular and organ physiology and integrative biology could be referred to PN. Applications that focus on human behavioral aspects of maternal nutrition (eating patterns, compliance with nutritional, behavioral, or psychosocial interventions or interpersonal support) as a risk factor or intervention for pregnancy outcomes could be referred to HOP or RPHB.
- **With the Biobehavioral and Behavioral Processes [BBBP] IRG:** There is shared interest in the area of the endocrinology of pregnancy as it relates to placental hormone production, maternal physiology, placental function, fetal growth and development and neonatal health, and mechanisms leading to parturition. Applications focused on basic aspects of these physiological process may be assigned to PN, whereas applications focused on the effects of behavioral factors on pregnancy, parturition and lactation or of the effects of these processes on feeding, cognition, regulation of emotions, psychopathology, behavioral development, parental and affiliative behavior, and other social processes could be assigned to BBBP.
- **With the Immunology [IMM] IRG:** There is shared interest in the area of reproductive immunology, including immuno-deficiency states in pregnancy and immuno-tolerance of pregnancy. Applications that focus on immune

phenomena as they relate to pregnancy and pregnancy outcomes may be referred to PN. Applications that focus on immune mechanisms or processes may be referred to IMM.

- **With the Infectious Diseases and Microbiology [IDM] IRG:** There is shared interest in genital tract infections in pregnancy, infection related pre-term labor, postpartum infections, and neonatal sepsis. Proposals that directly relate to pregnancy or reproduction could be referred to PN. Applications that focus on the infectious agent, mechanism of infection or treatment could be referred to IDM.
- **With the AIDS and Related Research [AARR] IRG:** There is shared interest in the area of vertical transmission of HIV and its therapy during pregnancy. However, because of the accelerated review of AIDS grant applications, these proposals generally will be referred to AARR.
- **With the Oncological Sciences [ONC] IRG:** There is shared interest with areas of gestational trophoblast neoplasias. Studies related to placental biology and function, could be assigned to PN. In contrast, when the focus is cancer biology or its treatment, ONC could be appropriate.
- **With the Cardiovascular Sciences [CVS] IRG:** There is shared interest in the areas of hypertensive disorders of pregnancy (including preeclampsia), maternal cardiac diseases, angiogenesis in placenta and uterine tissues, and fetal cardiovascular physiology and pathophysiology. Applications that directly relate to maternal or fetal cardiovascular physiology or disease could be referred to PN. Applications where the primary focus is systemic or regional circulation, hypertension or other aspects of angiogenesis or vascular cell biology may be assigned to CVS.
- **With the Digestive Sciences [DIG] IRG:** There is shared interest in the areas of placental nutrient transport and fetal growth. (1) Applications specifically related to placental function and fetal nutrition could be referred to PN. Dietary and physiological influences on the handling of nutrients, pharmaceuticals or xenobiotics by the gastrointestinal tract may be assigned to DIG. (2) When the primary focus is hormones of the gastrointestinal tract and peptides and neurotransmitters of the brain-gut axis, applications could be assigned to DIG. Applications that focus on the interaction of GI hormones with placental hormones could be assigned to PN.
- **With the Respiratory Sciences [RES] IRG:** There are shared interests in areas related to fetal and neonatal pulmonary development, physiology, pathophysiology, diseases and disorders. Applications dealing with effects of endocrine, metabolic, nutritional, or reproductive (pregnancy and fetal or neonatal well-being) factors on fetal or neonatal pulmonary development, physiology, pathophysiology, diseases and disorders, including Sudden Infant Death Syndrome (SIDS), could be assigned to PN. Applications that focus on physiological, cellular, or molecular aspects of pulmonary development or function or fetal and neonatal lung diseases and disorders could be assigned to RES. Applications that focus on pulmonary function in SIDS could also be assigned to RES.
- **With the Musculoskeletal, Oral, and Skin Sciences [MOSS] IRG:** There are shared interests in the neonatology and development of the musculoskeletal, oral and skin systems. Studies that focus on the physiology or pathology of these systems could be referred to MOSS. Studies that focus on the maintenance of pregnancy or overall fetal well-being could be referred to PN.
- **With the Renal and Urological Sciences [RUS] IRG:** (1) There is shared interest in the area of maternal renal diseases and hypertensive disorders of pregnancy (including preeclampsia). Applications that focus on conditions in the fetus or the pregnant female may be referred to PN. Studies that focus on renal hemodynamics, tubular function, and renal humoral/hormonal agents, as they affect renal function, may be assigned to RUS. Hypertension associated with renal insufficiency or end-stage renal disease may also be assigned to RUS. (2) Studies of female sexual medicine could be assigned according to the focus of the application, typically to PN. Studies of the male or female reproductive systems that focus on consequences to the kidney or the urinary tract, and urinary incontinence, could be assigned to RUS. (3) For proposals dealing with the fetal kidney, PN could be appropriate if the emphasis is fetal well-being or pregnancy. Other aspects of kidney

development could be appropriate for RUS.

- **With the Surgical Sciences, Biomedical Imaging and Bioengineering [SBIB] IRG:** There is shared interest in the area of fetal and maternal reproductive tract diagnostic imaging. Fetal and maternal studies that use documented imaging procedures, either in a research or clinical environment, could be appropriately reviewed in PN. Studies that focus on the development of imaging equipment or protocols could be referred to SBIB.
- **With the Molecular, Cellular, and Developmental Neuroscience [MDCN] IRG:** There is shared interest in fetal brain development. Applications dealing with fetal brain development as it relates to pregnancy outcome or neonatal health could be assigned to PN. MDCN could be assigned applications addressing molecular and cellular aspects of brain development and function.
- **With the Integrative, Functional, and Cognitive Neuroscience [IFCN] IRG:** There is shared interest in the areas of the endocrinologic aspects of pregnancy, pregnancy-related studies of pharmacology and toxicology, and fetal or neonatal growth and development. Applications focused on neural aspects of the behavioral effects of these processes could be assigned to IFCN. Applications focused on the processes themselves could be assigned to PN.
- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** There is shared interest in the areas of fetal brain development, hypoxic encephalopathy and fetal brain function. Applications dealing with these areas, as they relate to pregnancy outcome or neonatal health could be assigned to PN, whereas, BDCN could be assigned applications addressing normal and pathologic brain development and function.

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Cellular Aspects of Diabetes and Obesity Study Section [CADO]

[\[CADO Roster\]](#)

The Cellular Aspects of Diabetes and Obesity study section [CADO] includes all aspects of metabolic regulation related to type 1 and type 2 diabetes, including: islet biology; insulin secretion and action; signal transduction pathways and their regulation; obesity and adipocyte biology (including cellular metabolism and energy balance); and regulation of nutrient flux and metabolism in muscle, adipose tissue, liver, and islets.

Specific areas covered by CADO:

- Cellular and molecular mechanisms regulating fuel homeostasis and the pathogenesis of obesity and diabetes, including: glucose and amino acid transport and metabolism; protein synthesis and degradation; fatty acid synthesis and transport; lipogenesis and lipolysis; glycogen synthesis and gluconeogenesis; insulin action on glucose transport and metabolism; and insulin action on cell differentiation, proliferation, growth, and survival
- Differentiation, development, growth, and function of pancreatic islets; beta cell replacement; and stem cell biology
- Biosynthesis, trafficking and secretion of insulin and other islet hormones and novel factors that coordinate central and peripheral communication of nutrient status
- Mechanisms of regulation of insulin secretion by metabolites, ion fluxes, signal transduction, and autonomic and neuroendocrine pathways
- Structure and function of ligands, receptors, and other molecules involved in metabolic regulation and energy homeostasis (in the CNS and peripheral tissues)
- Mechanisms of insulin signaling, insulin resistance, and glucose transport
- Downstream signaling pathways in insulin action, including the actions of scaffold proteins, phospholipids, kinases, and phosphatases
- Modulation of insulin action by cytokines and altered nutritional and metabolic states

- Hypothalamic regulation of energy homeostasis, including: the role of metabolic substrates as well as endocrine, neuroendocrine, and cytokine-mediated mechanisms
- Differentiation and function of adipocytes, including: signal transduction mechanisms that control gene expression and cell function, as well as the structure and function of adipocyte-secreted biologically active molecules
- Mechanisms, genetic predictors, and the role of nutrients and diet in preventing complications of diabetes

CADO has the following shared interests within the EMNR IRG:

- **With Molecular and Cellular Endocrinology [MCE]:** Polypeptide hormone synthesis, secretion, and trafficking are areas of shared interest with MCE. In general, studies of hormone synthesis, secretion, trafficking, and signal transduction are referred to MCE. However, if the primary focus is islet or adipocyte hormone secretion, metabolic regulation, beta cell function, adipocyte differentiation, or cross-talk with insulin signaling, the application could be referred to CADO.
- **With Cellular Molecular and Integrative Reproduction [CMIR]:** The study of Polycystic Ovarian Syndrome (PCOS) overlaps with ovarian dysfunction. When the application is focused on gonadal biology assignment could be to CMIR. The application could be referred to CADO when the focus is insulin action or insulin resistance in PCOS.
- **With Pregnancy and Neonatology [PN]:** An application could be referred to PN if it focuses primarily on placental biology, pregnancy complications, or immediate fetal or maternal outcomes. If it focuses on carbohydrate metabolism, insulin secretion or long-term diabetes outcomes, it could be referred to either IPOD or CADO.
- **With Integrative Physiology of Obesity and Diabetes [IPOD]:** CADO and IPOD share conceptual and methodological interests. In general, applications that address more basic aspects of metabolic regulation (e.g., those using cell or tissue systems) may be referred to CADO; those using animal models may be referred to IPOD. Those focusing on human or animal models to validate hypotheses related directly to human pathophysiology may be referred to IPOD. Applications focusing on the actions of insulin and other hormones influencing energy homeostasis in the whole organism or integrating whole body insulin resistance and Polycystic Ovarian Syndrome (PCOS), especially in humans, may be referred to IPOD.
- **With Integrative Nutrition and Metabolic Processes [INMP]:** Applications focusing on lipoproteins or lipid metabolism could be referred to INMP. Applications focusing on basic aspects of metabolic regulation related to obesity or diabetes could be referred to CADO.

CADO has the following shared interests outside the EMNR IRG:

- **With the Genes, Genomes, and Genetics [GGG] IRG:** Genetics of obesity and diabetes may be areas of shared interest with GGG. Models of the complex genetic questions and mapping in animals or humans could be referred to GGG. Analysis of the functional consequences of specific genetic alterations concerning obesity and/or diabetes could be referred to IPOD or CADO. Genomic approaches to the molecular physiology of obesity and/or diabetes should be assigned in a manner consistent with the main focus of the application. If genomic tools (e.g., DNA or protein microarrays, high throughput sequencing, SNP detection, bioinformatics) are used primarily to address questions regarding the physiology/pathogenesis of these states, the application could be referred to IPOD or CADO. If a major focus is development of genomic techniques/materials for the study of these phenotypes, the application could be referred to GGG.
- **With the Biology of Development and Aging [BDA] IRG:** There may be shared interests in the area of aging research. Studies of metabolic regulation related to obesity and diabetes, regulation of nutrient flux and metabolism, and adipocyte biology could be referred to CADO. BDA may review applications with a primary emphasis on aging issues (i.e., on the role of aging changes or co-morbidity-related factors affecting

pathogenesis of diabetes and obesity in the elderly) when the study transcends a single organ system or discipline. BDA could also review applications that focus on the effects of diabetes and obesity on pathophysiologic processes in the elderly when the study transcends a single organ system or discipline.

- **With the Immunology [IMM] IRG:** Applications on autoimmune aspects of Type 1 diabetes that focus primarily on immunity could be referred to IMM. When the experimental focus is the effects of autoimmunity on beta cell function assignment could be to CADO.
- **With the Oncological Sciences [ONC] IRG:** Obesity or insulin resistance as a risk factor for cancer is an area of shared interest with ONC. If the primary focus is oncogenesis the application could be referred to ONC. If the focus is mechanisms related to metabolic fuel homeostasis, glucose homeostasis or insulin action on cell growth, it may be referred to CADO or IPOD. Applications that explore the relationship between insulin/IGF signaling and cancer of endocrine or neuroendocrine tissues could be referred to CADO.
- **With the Cardiovascular Sciences [CVS] IRG:** In general, applications focusing on the biology or pathogenesis of obesity or diabetes could be referred to CADO or IPOD. Studies relating to cardiovascular metabolism or blood flow as a chronic adaptation to obesity or diabetes leading to cardiac hypertrophy and heart failure, or the effects of insulin on the cardiovascular system could be assigned to CVS. Applications dealing with the role of lipids in inflammation of the vascular system, particularly in atherosclerosis, could be assigned to CVS.
- **With the Digestive Sciences [DIG] IRG:** (1) Studies of GI hormones may be an area of shared interest with DIG. Applications that focus on gut-mediated effects on feeding, satiety, energy-expenditure and islet hormone secretion could be referred to IPOD or CADO. When the primary focus is on hormones of the gastrointestinal tract and peptides and neurotransmitters of the brain-gut axis, applications could be assigned to DIG. (2) There is also shared interest in the area of cholesterol metabolism and complications of diabetes. Applications dealing primarily with lipid metabolism in the liver as it relates to Non-Alcoholic Fatty Liver Disease (NAFLD) could be assigned to DIG, while applications focusing on lipoproteins, lipid metabolism and diabetic complications could be assigned to IPOD or CADO.
- **With the Renal and Urological Sciences [RUS] IRG:** Studies of renal complications of diabetes may be referred to RUS; studies that focus on diabetes may be referred to CADO or IPOD.
- **With the Molecular, Cellular, and Developmental Neuroscience [MDCN] IRG:** Cellular and molecular studies that focus on diabetic neuropathy may be referred to MDCN; studies that focus on diabetes may be referred to IPOD or CADO.
- **With the Integrative, Functional, and Cognitive Neuroscience [IFCN] IRG:** Applications involving the central nervous system with a focus on metabolic homeostasis or causes of obesity are areas of shared interest with IFCN and could be referred to IPOD or CADO when end points relate primarily to cellular or systemic metabolic phenotypes or energy balance; and to IFCN when the focus is on the neural basis of ingestive behaviors or satiety.
- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** Physiological or clinical studies of diabetic neuropathy may be referred to BDCN; studies that focus on diabetes may be referred to IPOD or CADO.

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Integrative Physiology of Obesity and Diabetes Study Section [IPOD]

[\[IPOD Roster\]](#)

The Integrative Physiology of Obesity and Diabetes [IPOD] study section reviews applications related to all aspects of fuel (energy) regulation and the maintenance of homeostasis, including: communication between cells and tissues, the regulation of fuel (energy) flux between and storage in tissues and organs, and macronutrients related to energy metabolism and diabetes. Complications of these processes and their influence on disease are also addressed. Patient-oriented research and the use of animal models to explore hypotheses derived from human studies are included within the purview of this study section.

Specific areas covered by IPOD:

- Pathogenesis of obesity and diabetes: (1) genetic effects, including: maturity-onset diabetes of the young (MODY), Type 1 or 2 diabetes, mitochondrial genes and genes affecting energy homeostasis and obesity; (2) regulation of glucose, fat, and protein metabolism; (3) homeostasis related to the pathogenesis of obesity and diabetes; (4) effects of dietary glucose, fat, and protein and their excesses on the production, secretion, and action of hormones (including insulin) and cytokines (including leptin) mediating energy and glucose homeostasis
- Systemic regulation of insulin secretion and insulin action in liver, muscle, and fat
- Systemic actions of other hormones and cytokines (including leptin) when the central experimental focus is insulin action or energy homeostasis
- Energy expenditure, thermogenesis, physical activity, and exercise in the context of the pathogenesis or treatment of obesity
- Body composition and the mechanisms regulating, and metabolic consequences of the distribution patterns of adipose tissue
- Skeletal muscle biology relating to fuel metabolism, energy expenditure, accumulation of myocyte lipid, and possible secretory functions
- Central nervous system regulation of energy intake and expenditure and nutrient partitioning
- Mechanisms for sensing glucose and other nutrients
- Central nervous system effects and autonomic physiology related to energy metabolism on islet function and insulin action
- Hypoglycemia and counter regulatory mechanisms
- Adipocyte functions, including: nutrient storage and release, and communication with other organs and tissues
- Prevention and treatment of obesity and diabetes
- Genetic predictors for and the role of diet in preventing diabetic complications

IPOD has the following shared interests within the EMNR IRG:

- **With Molecular and Cellular Endocrinology [MCE]:** Polypeptide hormone synthesis, secretion, and trafficking are areas of shared interest with MCE. If the primary focus is islet or adipocyte hormone secretion, in the context of obesity or diabetes, applications could be referred to CADO or IPOD.
- **With Cellular, Molecular, and Integrative Reproduction [CMIR]:** The study of the physiology of Polycystic Ovarian Syndrome (PCOS) are shared interests between CMIR and IPOD. When the application is focused on ovarian function assignment could be to CMIR; applications that focus on insulin action and other aspects of relevant intermediary metabolism may be referred to IPOD.
- **With Pregnancy and Neonatology [PN]:** Applications may be referred to PN if they focus primarily on placental biology, complications of pregnancy, or immediate fetal or maternal outcomes. Applications focusing on carbohydrate metabolism, insulin secretion or long-term diabetes outcomes could be referred to either IPOD or CADO.
- **With Cellular Aspects of Diabetes and Obesity [CADO]:** CADO and IPOD share conceptual and methodological interests. In general, applications that address more basic aspects of metabolic regulation (e.g., those using cell or tissue systems) may be referred to CADO; those using animal models may be referred to

IPOD. Those focusing on human or animal models to validate hypotheses related directly to human pathophysiology may be referred to IPOD. Applications focusing on the actions of insulin and other hormones influencing energy homeostasis in the whole organism or integrating whole body insulin resistance and Polycystic Ovarian Syndrome (PCOS), especially in humans, may be referred to IPOD.

- **With Integrative Nutrition and Metabolic Processes [INMP]:** Applications focusing on lipoproteins and lipid metabolism may be referred to INMP. Applications focusing on fuel (energy) regulation and the maintenance of homeostasis, the regulation of fuel (energy) flux between and storage in tissues and organs, and macronutrients related to energy metabolism and diabetes may be referred to IPOD.

IPOD has the following shared interests outside the EMNR IRG:

- **With the Genes, Genomes, and Genetics [GGG] IRG:** Genetics of obesity and diabetes may be areas of shared interest with GGG. Models of the complex genetic questions and mapping in animals or humans could be referred to GGG. Analysis of the functional consequences of specific genetic alterations concerning obesity and/or diabetes could be referred to IPOD or CADO. Genomic approaches to the molecular physiology of obesity and/or diabetes should be assigned in a manner consistent with the main focus of the application. If genomic tools (e.g., DNA or protein microarrays, high throughput sequencing, SNP detection, bioinformatics) are used primarily to address questions regarding the physiology/pathogenesis of these states, the application could be referred to IPOD or CADO. If a major focus is development of genomic techniques/materials for the study of these phenotypes, the application could be referred to GGG.
- **With the Biology of Development and Aging [BDA] IRG:** There may be shared interests in the area of aging research. Applications that focus on the pathogenesis or treatment of diabetes and obesity in the elderly may be referred to CADO or IPOD. BDA may review applications with a primary emphasis on aging issues (i.e., on the role of aging changes or co-morbidity-related factors affecting pathogenesis of diabetes and obesity or responses to treatment in the elderly) when the study transcends a single organ system or discipline. BDA could also review applications that focus on the effects of diabetes and obesity on pathophysiologic processes, clinical outcomes and functional status in the elderly when the study transcends a single organ system or discipline.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** Shared interest exists in the measurement of intracellular and physiological levels of glucose and other metabolites. Applications that propose the development of new sensor technology are appropriate for BST; studies that use the instrumentation to monitor metabolite levels are appropriate for IPOD.
- **With the Health of the Population [HOP] IRG:** Applications that the focus on population- or community-based initiatives, e.g., education, provision of services, policy, and those that focus on socio-demographic variables could be assigned to HOP. Studies related to epidemiology or large scale interventions for obesity or diabetes may generally be assigned to HOP. Studies of diabetes and obesity involving the effects of human behavior on obesity, energy expenditure and food intake; studies of behavior modification directed toward the prevention or treatment of diabetes or obesity; or studies that focus on behavior as a risk factor for and as prevention of diabetes or obesity, or to moderate energy expenditure and food intake could be assigned to HOP.
- **With the Risk, Prevention and Health Behavior [RPHB] IRG:** Shared interest exists regarding the metabolic regulation of obesity, diabetes, and insulin secretion and action. Applications that utilize methodologies focusing on regulation at the cellular and molecular level could be assigned to IPOD. Applications that focus on modification of individual behaviors, attitudes, psychosocial supports and resources as they affect prevention or treatment of obesity, diabetes, and insulin secretion and action could be assigned to RPHB. Applications that focus on human behavior as a risk factor for and as prevention of obesity, or to moderate energy expenditure and food intake could be assigned to RPHB.
- **With the Biobehavioral and Behavioral Processes [BBBP] IRG:** Effects of endocrine regulation of behaviors in obesity, energy expenditure, and food intake may be areas of shared interest with BBBP. Applications that focus on gut-hormone mediated effects on behavioral processes related to feeding, satiety, and activity may be

assigned to BBBP.

- **With the Oncological Sciences [ONC] IRG:** Obesity or insulin resistance as a risk factor for cancer is an area of shared interest with ONC. If the primary focus is oncogenesis, the application could be referred to ONC. If the focus is fuel homeostasis, glucose homeostasis or insulin action on cell growth, it could be referred to CADO or IPOD.
- **With the Cardiovascular Sciences [CVS] IRG:** In general, applications that focus on the biology or pathogenesis of obesity could be referred to CADO or IPOD. Applications that focus on the cardiovascular effects of obesity, e.g., left ventricular hypertrophy (LVH) or end stage arterial disease, may be referred to CVS.
- **With the Musculoskeletal, Oral, and Skin Sciences [MOSS] IRG:** Exercise may be an area of shared interest with MOSS. If the application deals primarily with the effects of exercise on the treatment, prevention, or consequences of obesity, diabetes, or insulin action, it could be referred to IPOD. Applications that primarily address the effects of exercise on skeletal muscle mass, function, or metabolism could be referred to MOSS.
- **With the Digestive Sciences [DIG] IRG:** (1) The study of GI hormones may be an area of shared interest with DIG. Applications that focus on gut-mediated effects on feeding, satiety, energy expenditure and islet hormone secretion could be referred to IPOD or CADO. When the primary focus is hormones of the gastrointestinal tract or peptides and neurotransmitters of the brain-gut axis, applications could be assigned to DIG. (2) There is also shared interest with cholesterol metabolism and complications of diabetes. Applications dealing primarily with lipid metabolism in the liver as it relates to Non-Alcohol Fatty Liver Disease (NAFLD) could be assigned to DIG, and applications focused on lipoproteins, lipid metabolism, or diabetic complications could be assigned to IPOD or CADO.
- **With the Renal and Urological Sciences [RUS] IRG:** Applications that focus on the effects of nutrient metabolism in diabetic nephropathy and diabetes-induced metabolic abnormalities may be referred to IPOD. RUS could be assigned applications on renal transport mechanisms intrinsic to diabetic nephropathy, diabetes-induced renal pathology, and diabetes-induced urologic pathology.
- **With the Integrative, Functional, and Cognitive Neuroscience [IFCN] IRG:** Studies of the central nervous system that focus on metabolic homeostasis or causes of obesity are of shared interest with IFCN. These could be referred to IPOD or CADO when end points relate primarily to cellular or systemic metabolic phenotypes or energy balance and to IFCN when the focus is on the neural basis of ingestive behaviors or satiety.
- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** Physiological or clinical studies that focus on diabetic neuropathy or diabetes-induced abnormalities may be referred to BDCN; studies that focus on diabetes may be referred to IPOD or CADO.

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Integrative Nutrition and Metabolic Processes Study Section [INMP]

[\[INMP Roster\]](#)

The Integrative Nutrition and Metabolic Processes study section [INMP] reviews research grant applications dealing with the integration of molecular events, gene responses, metabolic processes, and physiological functions that pertain to macronutrients (carbohydrate, fat, and protein), micronutrients (vitamins and minerals), and other food components. Complications of these processes and their influence on disease are also addressed here. Approaches span basic to patient-oriented research using cell culture systems, genetically manipulated animals, and human studies.

Specific areas covered by INMP:

- **Protein Metabolism:** Human, animal, and cellular studies of proteins, amino acids, and their metabolites regarding mechanisms of their synthesis, utilization, degradation, and metabolism and the inter-organ flux of these components.
- **Lipid Metabolism:** The role of cholesterol, phospholipids, and fatty acid metabolism in physiological and pathophysiological processes (including gene regulation). Studies may range from cellular to patient-oriented research.
- **Lipoprotein Metabolism:** The biogenesis and catabolism of lipoprotein particles, the transfer of lipids among particles, and the role of lipoproteins in health and disease.
- **Carbohydrate Metabolism:** Human, animal, and cellular studies of glucose, disaccharides, polysaccharides and their metabolites regarding mechanisms of their synthesis, utilization, and metabolism, and inter-organ flux of these components.
- **Intermediary Metabolism:** The flow of substrates through metabolic pathways, regulation of the metabolic processes, and identification of new pathways involving nutrients and other food components. Substrate turnover and flux of carbohydrates, amino acids, lipids, fatty acids, vitamins, and minerals may be investigated in health and disease states other than diabetes and obesity. In vitro, or compartmental models may be used as well as in vivo approaches.
- **Vitamin Metabolism:** Cellular through human studies of vitamin requirements, utilization, metabolism, and function (including genotype-phenotype relationships of vitamin metabolism). Vitamins as modifiers of the functions of specialized cells (including dose-response studies over a range from deficient to excessive); relationship of vitamin metabolism and function in neurochemistry, brain dysfunction, and cognition.
- **Mineral Metabolism:** Cellular, animal, and human studies of absorption, transport, metabolism, and the function of macro and trace elements; approaches include the use of genetically manipulated animals, genomics, and human subjects using a wide range of levels from deficient to excessive; studies of the functions of minerals including the role of metals in: neurochemistry and cognition, the acute phase response, immune function, and cellular development.
- **Other Food Components:** The cellular, metabolic, and functional effects of other components in the food supply that influence health and disease in humans; this includes studies of the role of carotenoids, flavonoids, and other phytonutrients on metabolic processes, cellular function, and gene expression.
- **Differentiation, Neoplasia, and Immune Response:** Human, animal, and cell studies of the effect of nutrients and other food components on normal and abnormal cell differentiation and proliferation; studies of underlying mechanisms as well as the effects on nutrient metabolism and function and studies of the effects of nutrients, or other dietary components, on immune functions or responses.
- **Inborn Errors of Metabolism:** The molecular mechanisms underlying inherited disorders of metabolism involving amino acids, carbohydrates, fatty acids, vitamins, and minerals.
- **Oxidative Stress and Antioxidants:** The effect of nutrients, other food components, and metabolic substrates on the generation of reactive oxygen and nitrogen species and on disease processes; and the contribution of specific nutrients, and other food components to antioxidant defense.

INMP has the following shared interests within the EMNR IRG:

- **With Molecular and Cellular Endocrinology [MCE]:** INMP reviews studies of the effect of hormones on nutrient metabolism. This includes studies at the cellular level, their role in integrating the metabolism of nutrients and food components at the organismal level, and the consequences of inadequate or excessive nutrient supplies on hormone actions. Studies of the mechanism of hormone action on nutrient metabolism other than glucose metabolism may be referred to MCE if the focus is the mechanism or its implications.
- **With Pregnancy and Neonatology [PN]:** Studies of the effect of pregnancy and reproductive hormones on nutrient metabolism may be referred to INMP. Abnormalities of fuel metabolism, such as gestational diabetes, may be referred to IPOD.
- **With Integrative Physiology of Obesity and Diabetes [IPOD]:** There is shared interest with IPOD, particularly as related to lipids and lipoproteins, the metabolism of which is frequently disturbed in both diabetes and the metabolic syndrome/central obesity. Moreover, nutritional approaches are central to the management of both diabetes and obesity. In general, INMP may review in vivo aspects of protein and lipid metabolism, while IPOD may review in vivo aspects of carbohydrate metabolism. However, these distinctions are flexible, since metabolism of the three substrates is inter-related. Applications dealing with energy intake, satiety, energy expenditure, and energy balance may be referred to IPOD. INMP could be assigned studies of the effects of micronutrient metabolism in obese and diabetic populations.

INMP has the following shared interests outside the EMNR IRG:

- **With the Genes, Genomes, and Genetics [GGG] IRG:** Applications that address the role of nutrients on gene expression or the role of genes on nutrition could be referred to INMP or to GGG depending whether the utility of the study's outcome is uniquely related to endocrinological issues.
- **With the Cell Biology [CB] IRG:** Cell biology studies of the role of macronutrients, micronutrients and other food components in metabolic processes and physiological function or dysfunction may be areas of shared interest and could be referred to CB if the focus of the study is basic cell biology or to INMP if the focus of the study is nutrition or a nutrition-related disease.
- **With the Biology of Development and Aging [BDA] IRG:** Studies of nutritional or metabolic factors underlying mechanisms of aging or control of aging processes, or of the role of nutritional or metabolic factors in clinical, physiologic, or pathophysiologic age-related changes, could be referred to INMP or BDA depending whether the utility of the study's outcome is uniquely related to endocrinological issues.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** Shared interest exists in the measurement of intracellular and physiological levels of glucose and other metabolites. Applications that propose the development of new sensor technology could be referred to BST; applications that propose the use of instrumentation to monitor metabolite levels could be referred to INMP.
- **With the Health of the Population [HOP] IRG:** Shared interest exists in the area of nutritional behavior. INMP may be assigned studies of the metabolic consequences of dietary behaviors. Studies of dietary selection behavior and patterns of food consumption and studies related to epidemiology, large-scale interventions for obesity or diabetes or applications that focus on their effect on the level of human health could be assigned to HOP.
- **With the Risk, Prevention and Health Behavior [RPHB] IRG:** Shared interests exist in the areas of lipid and lipoprotein metabolism and their roles in disease onset, and the complications of diabetes, specifically regarding the role of diet in prevention and risk reduction. Applications that focus on metabolic changes associated with lipid, lipoprotein and dietary changes may be assigned to INMP. Applications that focus on behaviors, attitudes, or psychosocial factors that affect risk and disease outcomes could be assigned to RPHB.

- **With the Immunology [IMM] IRG:** In general, applications that focus on the effects of nutrients or other dietary components on immune functions or responses should be referred to INMP.
- **With the Cardiovascular Sciences [CVS] IRG:** Proposals that focus primarily on general glucose or lipid metabolism; or the effects of obesity, or dietary changes on the whole body or multiple organ systems could be assigned to INMP. Studies relating to cardiovascular metabolism or blood flow as a chronic adaptation to obesity or diet leading to cardiac hypertrophy and heart failure could be assigned to CVS. Applications dealing primarily with the role of lipids in the inflammation of the vascular system, particularly atherosclerosis, could be assigned to CVS.
- **With the Musculoskeletal, Oral, and Skin Sciences [MOSS] IRG:** Basic, translational or clinical applications that focus on nutrients, or general nutrition where oral and dental disease, bone disease, skeletal muscle or connective tissue are a secondary part of the study, may be assigned to INMP. Basic, translational or clinical applications that focus on disease, injury or repair of these tissues/systems, where the role of nutrients, or general nutrition are a secondary part of the study, may be assigned to MOSS.
- **With the Digestive Sciences [DIG] IRG:** Shared interests occur in several areas. (1) In the area of xenobiotic and/or nutrient metabolism, and toxicology: Applications could be assigned to DIG when the xenobiotics or nutrients are being used at therapeutic or toxicological doses. Applications dealing with metabolic aspects of nutrients or food components, once absorbed and available to non-digestive system tissues and cells, could be assigned to INMP. (2) In the area of metabolism: Assignment could be made to DIG when the focus of the application is the digestion, absorption, and metabolism (in the GI tract, liver, or pancreas) of nutrient and non-nutrient components of the diet or supplements, when presented at physiologic levels. Studies of metabolism by organs or tissues other than those of the digestive system as well as subsequent disposition, transport and excretion could be assigned to INMP. (3) In the area of nutritional support: Studies that focus on the use of nutritional support in the treatment metabolic disorders and diseases could be referred to INMP. Studies that focus on the role of digestive/gastrointestinal system could be assigned to DIG. (4) In the area of lipid metabolism: Applications dealing primarily with lipid metabolism in the GI tract and liver could be assigned to DIG. Applications that focus on lipoproteins and lipid metabolism could be assigned to INMP.

**Endocrinology, Metabolism, Nutrition, and Reproductive Sciences Small Business Activities
[SBIR/STTR] Special Emphasis Panel [EMNR Small Business SEP - EMNR (10)]**

[\[SBIR/STTR Rosters\]](#)

The SSS-T study section [after 02/2004 to be called EMNR (10): EMNR Small Business SEP] considers SBIR/STTR applications involved in areas of endocrinology, metabolism, nutrition, and reproductive sciences. These include applications of emerging technologies and methodologies for a broad spectrum of research related to all aspects of general endocrinology, pregnancy, reproductive physiology, nutrient metabolism and processes in normal states as well as diabetes, obesity and related diseases.

Specific areas covered by the EMNR Small Business SEP:

- □□□□□□□ Mechanisms of hormone action
- Hormone assay kits
- Disorders of endocrine organs and their treatment

- Endocrine toxicology and hormone-based therapies
- Animal cloning, assisted reproductive technology, contraception, and devices related to reproduction
- Devices and procedures related to female gonads
- ☐ Studies of sperm, oocyte and fertilization
- Implantation
- Devices and procedures related to obstetrics and gynecology
- Disorders of pregnancy and their treatment
- Control of lactation
- Evaluation of nutritional status throughout the life cycle
- Nutrient and dietary intervention in the treatment of disease
- Applications of techniques for measuring body composition and energy utilization
- Energy expenditure, thermogenesis, physical activity, and exercise in the context of the pathogenesis or treatment of obesity
- Mechanisms, pathogenesis, and treatment of obesity and diabetes
- Differentiation, development, growth, and function of pancreatic islets
- Beta cell replacement
- Adipocyte function, including: nutrient storage and release, and communication with other organs and tissues

The EMNR Small Business SEP has the following shared interests outside the EMNR IRG:

- **With the Biology of Development and Aging [BDA] IRG:** There is shared interest in the areas of gametogenesis, fertilization, and embryonic/fetal development including: formation of egg and sperm, fertilization, pre-implantation, animal cloning, and organogenesis. When the focus of the application is pregnancy, reproduction, or endocrinology, assignment may be to EMNR. When the focus is on development or its mechanisms, assignment may be to BDA.
- **With the Renal and Urological Sciences [RUS] IRG:** There is shared interest between EMNR and RUS in the areas of male reproductive biology, the male reproductive tract, including the prostate, maternal renal diseases and hypertensive disorders of pregnancy (including preeclampsia), and the mechanism of action of hormones on the male genital system. The perspective of the applicant should determine assignment, but in general the central focus of applications reviewed in EMNR is on reproductive competency or hormone action, while the focus of RUS is on the renal system or urology.
- **With the Bioengineering Sciences and Technologies [BST] IRG :** (1) Applications that focus on emerging technologies for obtaining functional analysis of genomic and proteomic patterns could be assigned to BST, while studies that focus on the functional analysis of genomic and proteomic patterns of hormone action may be assigned to EMNR. (2) Applications that focus on the development of new sensor technology could be assigned to BST; studies that use the instrumentation to monitor metabolite levels are appropriate for EMNR.
- **With the Cardiovascular Sciences [CVS] IRG:** (1) Shared interests exist for studies of the effect of hormones on the vascular system, gonadal and placental angiogenesis, hypertensive disorders of pregnancy (including preeclampsia), and fetal cardiovascular physiology and pathophysiology. Studies that focus on the role of hormones or on pregnancy and fetal well-being could be referred to EMNR, if focus is on the vascular system, assignment could be to CVS; (2) Studies of cardiovascular metabolism or blood flow as a chronic adaptation to obesity, diabetes, or diet leading to cardiovascular symptoms, or the effects of insulin on the cardiovascular systems could be assigned to CVS; and (3) Applications that focus on the role of lipids in inflammation of the vascular system, such as atherosclerosis, could be assigned to CVS.
- **With the Digestive Sciences [DIG] IRG:** Shared interests exist in several areas. (1) Studies in the area of xenobiotic/nutrient metabolism/toxicology, endocrine disruptors, hormones of the pituitary or pancreas that are involved in metabolic function, and placental nutrients and fetal growth could be assigned to DIG when they are being used at therapeutic or toxicologic doses; if the endocrine system is the primary focus, assignment could be

to EMNR. (2) Assignment could be made to DIG when the focus of the studies is the digestion, absorption, and metabolism in the GI tract, liver, or pancreas of nutrient and non-nutrient components of diet or dietary supplements when presented at supra physiologic levels. Studies of metabolism by organs or tissues other than those of the digestive system as well as subsequent disposition, transport, absorption and excretion could be assigned to EMNR. (3) Applications dealing with lipid metabolism in the GI tract and liver could be assigned to DIG, while studies that focus on lipoproteins and lipid metabolism could be assigned to EMNR.

- **With the Musculoskeletal, Oral and Skin Sciences [MOSS] IRG :** (1) Applications that focus on the remodeling of reproductive function, the maintenance of pregnancy, or overall fetal well-being may be assigned to the EMNR IRG, whereas applications that focus on bone disease or pathology or development of the musculoskeletal, oral or skin systems in the neonate may be assigned to MOSS. (2) Applications that focus on the effects of exercise on the treatment, prevention, or consequences of obesity and diabetes or insulin action could be assigned to EMNR. If the focus is on the effects of exercise on skeletal muscle function or metabolism, assignment to MOSS may be appropriate. (3) Applications that focus on nutrients may be assigned to EMNR; where the role of nutrients is secondary to the study of oral, dental, bone, skeletal muscle, or connective tissue, the application may be assigned to MOSS.
- **With the Oncological Sciences [ONC] IRG:** In general, studies of endocrine cancers (such as pituitary, thyroid, mammary, endometrium, and gestational neoplasias) could be assigned to EMNR if the proposal involves hormone action or reproductive well-being. Proposals that focus on the biology or clinical aspects of cancer, where hormones receive a secondary consideration, could be assigned to ONC. Studies of obesity, if the primary focus is oncogenesis, could be assigned to ONC; if the focus is fuel homeostasis, glucose homeostasis, or insulin action on cell growth, it could be assigned to EMNR.
- **With the Risk, Prevention, and Health Behavior [RPHB] IRG:** Shared interest exists regarding the metabolic regulation of obesity, diabetes, consumption of food and nutrients for different population groups. Applications that focus on modification of individual behaviors, attitudes, educational methods and program strategies, psychological support and resources as they affect prevention or treatment of obesity, diabetes, and insulin secretion and action, could be assigned to RPHB. Applications that focus on metabolic changes associated with food consumption, nutrients, and dietary changes may be assigned to EMNR.

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